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THE PEABODY MUSEUM'S EXPLORATIONS IN  
OHIO.

BY F. W. PUTNAM.

I CAN truly say a new chapter has been added to our archaeological work in the valley of the Little Miami. First, you must know that our camp is pitched by the side of the great pile of earth we turned over in our explorations of the group of altar mounds on the land of Mr. Michael Turner. We have been working, with occasional necessary intermissions, on this and the adjoining farm of Mr. Benjamin Marriott for the past five years, and this is the place where we have discovered so much of interest within the great earthwork of which the following is a sketch :

A hill through which two ditches, thirty feet deep, had been cut, separated the hill into three parts. Around the central portion a wall of earth had been raised, making a perfect circle 550 feet in diameter. In this inclosure was a large mound, and near it a small one. These mounds proved of great interest, particularly the large one, with its stone wall four feet high, surrounding an altar of burnt clay. We found several human skeletons in the clay outside of the stone wall and two others on the wall, with various objects made of copper, shell and stone. The earth taken from the ditches was used to make the graded way from the top of the hill to the level land below. This graded way connects with an embankment of earth, somewhat oval in shape and 1500 feet in its greatest diameter, in which are two openings. Opposite the northern opening is an earth circle 300 feet in diameter, and in this is a small mound which we have not yet explored. Opposite the eastern opening is a mound nine feet high. It was on this mound that we began our work at this place five years ago. At the foot of the graded way is a small circle inclosing a burial mound. North of this circle were two other burial mounds, and east of it was the great group of altar mounds, around each of which was a wall of stones four feet high, built below the surrounding level of the field. These mounds contained from one to seven altars, formed of clay, on which fierce fires had been made. It was in two of the basins of the altars in the mounds that I found the immense number of ornaments of various kinds, particularly of copper, the 60,000 pearls, shell-beads and other objects, also the wonderful little figures of terra

cotta representing men and women. All these objects had been thrown into the fires upon the altars, evidently as sacrifices or burnt offerings during an important ceremony. The thirty-seven pits with the singular tubes or "flues" connected with them; the concrete layer of gravel and iron over them; the singular structure of the great mound, a hundred feet in diameter and twenty feet high; the great pit containing the many skulls, some of which had holes drilled in them, arranged around two skeletons placed in ashes, all serve to show that connected with this group of mounds were extensive ceremonies of the deepest import to the people.

These extensive earthworks, made on such an elaborate scale, and containing evidence of the wealth of the builders as well as of the ceremonial character of the works themselves, necessarily lead to the conclusion that there must have been a large number of people connected with their construction. The beautiful location of this group of earthworks on the level second terrace which extends for miles in the fertile valley, and is surrounded by hills from which flow never-failing springs, indicate that in this region there must have been a large population; yet the few human remains which we found in the mounds within and without the encircling wall are not sufficient to meet the requirements. Such remains were probably those of distinguished persons, buried with special honors; but where were the other dead? Then the many altars, or basins of burned clay, which evidently had been used over and over again, and were, with two exceptions, empty when the mounds were erected over them, are indications of cremation, and yet where were the burnt human remains? Cremation in open fires will, necessarily, leave many fragments of calcined bones with the ashes, unless such remains are burnt over and over again, and special pains taken to reduce all to ashes, and yet we had found, in a niche of the stone wall about the large altar mound, the burnt bones and ashes of but one individual. If these altars were the places where cremation took place, what then had become of the remains? These were questions which Dr. Metz and myself often asked of each other, and we felt confident that somewhere near by there must be a general burial place for the common dead, and many a hunt was made for surface indications. On the north and south sides of Mr. Turner's barn, and west of the large circle, are two scarcely

perceptible ridges, similar to other slight irregularities here and there over the field. Owing to the cultivating of this place for many years and to the tramping of cattle in the barnyard, these ridges have been more or less worn down, and a few water-worn stones have been exposed on the surface. These were first noticed by Dr. Metz about a year ago. As soon as our camp was pitched we took a look at these water-worn stones. They were fragments of limestone filled with fossils of the Silurian age lying on a deposit of gravel over which, long ago, had flowed the waters of the Little Miami. What more could these stones have said, had they been endowed with speech, than that which was evident to our eyes: "We were long ago brought here by men." Here, then, was something more to be revealed in connection with the history of these great earthworks of an ancient race, and here we would dig a trench on the morrow. We started our trench sixty feet west from the wall of the circle, and well outside of the slightly elevated portion, which, we were afterward told by Mr. Snyder who remembers the place fifty years ago, was formerly much more marked, and had the appearance of a long low mound. Digging down to the hard pan, we carried our trench westward for about ten feet, when we came to three large water-worn stones regularly arranged, side by side, in the gravel hard pan.

It is necessary to fully understand the character of the earth in which we were working in order to appreciate the labors of the ancient people at this place, and I may well add our own in making these researches. First, the surface consists of a few inches of dark soil overlying from eight to ten inches of clay. Under this clay is a layer of coarse gravel containing many pebbles, some of considerable size, but all colored and firmly cemented by an amount of iron which, from some natural cause, is far in excess of that in the gravel all about. This iron-cemented gravel forms an irregular layer of from one to four feet in depth, and under it is a loose, uncolored gravel mixed with sand which, judging from a pit near by, is certainly thirty feet in depth, and probably much more. It may be that this is part of the great terminal glacial moraine which Professor Wright has been tracing across the State of Ohio. In this iron gravel the stones we found were imbedded. On cleaning off these stones we found that there were others at right angles to them, and soon we made out

that we had at last discovered a grave. Would it prove to have any connection with the people who built the earthworks and the altar mounds? Our hopes were great, and they were soon to be realized as far as one grave could tell its story. On carefully removing the earth from the eastern end of the grave, close to the stone, we discovered the toe bones of a human skeleton, and after several hours of the hardest kind of trowel digging, we had the satisfaction of exposing the skeleton lying at full length on its back. Its skull, slightly turned to the right, rested on a flat stone at the western end of the grave. On the left side of the skull was a large sea-shell of the genus *Busycon*, from which the central portion had been removed, a common method of making vessels among the various peoples of America, and often found in burial mounds and graves from the Gulf States to Michigan. With the bones of the neck were several shell beads, also of a common form, and as widely distributed over the country as the *Busycon* shells. The arms were extended at full length along each side, and inclosed by the bones of each hand, resting on the hips was a spool-shaped ornament (which our explorations have proved to be ear ornaments) made of copper, and like those found with several of the skeletons in the mounds of this group. We have at the museum ear ornaments of this character from burial mounds in various parts of Ohio and west to the Mississippi in Illinois, and from Central Tennessee, but I have never found them in any of the several thousand stone graves of the Cumberland valley which I have explored, nor have we found a trace of them among the several thousand graves associated with the singular ash-pits in the cemeteries which we have explored in the Little Miami valley, nor with the skeletons buried in the stone mounds nor in many of the simple burial mounds of Ohio. They seem to be particularly associated with the remains of a people who practiced cremation to some extent, and who built many of the great earthworks of the Ohio valley. That it is an ancient form of ornament, made from native copper, there can be no doubt, although they may have been made also by the descendants or conquerors of this people in later times; and it is not at all improbable that the form of the ornament may have survived to the time of contact of the "red race" with the white. I can only say that in all the recent Indian graves I have opened or know about, this peculiar character of ornament has not been

found; and if they were ever made by the whites and furnished to the Indians, I have never happened to find any that showed evidence of the fact. We have certainly found them under such conditions in Ohio that they must have been buried with their owners long before the discovery of America. Then again, all we have found have been made by hammering pieces of native copper, and not by casting the metal.

By the side of the right tibia of the skeleton in the grave was a copper pin, a wooden bead covered with thin copper, a few long, slender flakes of flint, and a fragment of some kind of an ornament made of shell. These long flint knives are of the same shape and character as the well known obsidian flakes from Mexico, and we have found them, as a rule, associated with copper ear ornaments like those in this grave. They are sharp edged, and are as good knives as the Mexican flakes. While speaking of them in general terms as flint, they are in reality flakes struck from several varieties of stones, many of them being of a bright red jasper and others of chalcedony. The wooden bead covered with copper is of the same character as others we have taken from the burial mounds in which we have found the copper ear ornaments. Close to the right hand and hip, but two inches above them, and covering a space a foot in diameter, were a mass of fragments of burnt human bones, with bits of charcoal mixed with ashes. These remains of a cremated body had been gathered from the place where it had been burnt, brought to this grave and placed by the side of the body at the time it was laid in the grave. The close contact of the remains to the finger bones of the skeleton, which were not disturbed, was sufficient evidence of this. Here, then, in one grave, we had found the evidence associating it with the altar mounds and the rest of the earthworks about, independently of the fact that the grave itself was within the earth wall surrounding all the other works. We had found evidently the burial place of the people, and this was abundantly confirmed as our work progressed.

We have now for two weeks been engaged in exploring this burial place, and during this time we have discovered eighteen graves, four large deep pits, and several holes dug in the gravel, as well as places where there had been fires, and numerous other interesting facts, many of which by themselves would be trivial, but which, when they are all put together, will give a far better

idea of the customs and works of the people who made the great earthworks in Ohio than it has been possible heretofore to obtain. All other explorations in the State have been fragmentary. No other systematic work has been attempted, and hence we have had plenty of theories built upon partial facts. We have much to do before the exploration is completed even of this single group.

To give a detailed account of all we have found during these two weeks would, I fear, draw too much on the patience, and I shall only call attention now to a few of the more interesting points. Individuality had its exemplification in this old cemetery, the same as it has in our modern ones, and the modifications are so great that no two of the graves thus far discovered are alike. In one instance there were no stones about the skeleton; in another a carefully built wall had been made of long, narrow, flat stones, and a regular wall, four layers high, had been made in the same way that a mason lays bricks, but without mortar. In some graves flat stones were placed at the bottom; in others the skeleton was firmly imbedded in the gravel, while in one the body had been placed on a thin layer of clay placed over the gravel. In one grave there were two skeletons, one extended at full length on its back and the other crowded into the grave by the side of the right leg of the first. A child was placed in a small circular grave, the body having been so arranged that the head and the feet were not far apart. Most of the graves were comparatively shallow, extending from six inches to a foot into the layer of gravel. The deeper the grave the better the condition of the skeleton. One grave was dug to the depth of nearly four feet in the gravel, and was seven feet long by four in width. At the bottom was a pavement of flat stones, forty-nine in number. On these stones the body had been extended, and the grave had been filled up with over three hundred stones, all of which had been brought from the river bed, nearly a quarter of a mile distant. Over these stones six inches of gravel had been placed, around and over which other stones had been regularly arranged. The free percolation of water through the stones had filled up the grave and caused the skeleton to decay, only a few fragments being left. The graves were not covered with large stones, as is the case with the stone graves of Tennessee, and there is but little in common between the two. Another class of graves were

basin-shaped, small in size, and carefully made of flat stones. In them we found burnt human bones and ashes. In one was a pipe carved from stone which had been burnt with the body, and in another were fragments of a burnt copper ornament.

I must give an account of the graves which were of particular interest.

Grave No. 5 in our notebook was six feet six inches long, two feet nine inches wide, and one foot eight inches deep, measured from top of the stones. It was made with care, and the stones were carefully placed so as to form a substantial wall. The bottom was completely covered by four large, flat stones, on which the skeleton lay on its back. The skull was at the east end of the grave. When the body was put in the grave the knees were drawn up, the left hand rested on the body, and the right was laid straight along the side. The result was that the bones of the left hand were found in close contact with the upper ends of the tibiae, which had fallen down between the femora. In the bones of each hand was a copper ear ornament like those I have mentioned. In the corner of the grave, near the bones of the left foot, was a large sea shell, from which the central portion had been cut away. Near this was a little cup carved out of stone, two canine teeth of a bear, each with lateral perforations, and in each tooth was the chalky remnant of a large pearl. Close to them was a large crystal of galena, and a knife made of a long flake of flint. On the same side of the grave, nearly opposite to the shoulder and partly under the side stones, were eight of the copper ear ornaments in a bunch, and under them a long bone point. We did not discover them until we had taken out the skeleton and began to remove the stones, for it is our rule always to remove everything placed by human hands, and to turn over every inch of dirt previously disturbed. On taking up the flat stones, which were firmly imbedded in the gravel, and had their edges covered by the side stones, we found the following articles, which must have been placed where we found them before the stones had been put down. Under the second stone (there was nothing under the first) near the center was a copper bead and small thin pieces of iron, probably meteoric, but it has not yet been analyzed, and it may prove to be bog iron which has formed in that place. As we have found several ornaments made of meteoric iron on the altars of the mounds in this group, as well as two good-sized



pieces of an iron meteorite, I strongly suspect that this iron will prove to be the same. Under the third stone, were two disks or halves of a copper ear ornament. These were several inches apart, and must have been so placed when the stone was put down. Near these was a wooden bead, with a thin covering of copper. Under the next, or fourth stone, were several of the long flint flakes or knives, and eight inches from the edge of the stone was a small copper celt. These deposits, under the stones of which the body was to be placed, certainly suggest the offerings of friends at the time the grave was prepared, and the various other objects placed in the grave with the body can, with equal reason, be looked upon as the property of the deceased, or as friendly offerings. At all events they are important as proof that the individuals buried here belonged to the people who built the mounds, as these several objects are of the same character as the many we have found on the altars, and with the few skeletons in the burial mounds of the group.

Grave 15 of our notes was remarkable for the care with which the walls, sixteen inches high at the head and foot, were made of four layers of flat stones, while along the sides, in the clay above the gravel layer, were simply a row of stones. The skeleton was lying firmly imbedded in the gravel, extended at full length on its back, with the skull at the west end of the grave, while the toe bones were against the opposite stones. The skeleton thus extended the full length of the grave, which was six feet three inches. As with nearly all the adult skeletons, there was a copper ear ornament in the bones of each hand. On the breast bone was a copper band. At the neck were two shell beads, and near the left shoulder was a flake knife. A few inches from the left foot were about twenty of the long flake knives, carefully laid together, as if they had been wrapped in a piece of skin or cloth when placed in the grave.

With two other skeletons we found celts made of soft coal. These were perfectly made, with fine smooth edges and polished surfaces, in exact imitation of the ordinary stone celt or hatchet; but as they would have been worthless for the uses to which stone celts were put, it is likely that they were ornamental or ceremonial objects.

I will allude only to one more grave, No. 18 of our notes. This was marked by a mass of gravel a little over seven feet long and

nearly three feet in width, around the edges of which were small stones, eight to twelve inches long. This mass stood up eight inches from the gravel layer under the clay. Removing these stones and gravel, we found loose gravel filling a pit just seven feet long and three feet four inches wide. At the depth of two feet we came to hard undisturbed gravel, and on this was a human skeleton extended at full length on its back, with the skull at the south-east end of the grave. The bones were firmly imbedded in the gravel, and so dry that great care was necessary in removing this matrix. However, after six hours of unremitted labor with small trowel and brush, they and the several objects associated with them were all uncovered and left in place, even to the finger and toe bones, and a photograph was taken showing everything in place. In each hand was one of the copper ear ornaments of the kind I have referred to so often. The finger bones were so arranged as to show that these ornaments had been clasped in the hands at the time of the burial of the body. Another of these ornaments was on the neck bones in contact with the under jaw. On each side of the copper ornament was a canine tooth of a bear, with the lateral perforations. Partly over the bear's tooth, on the left side, was a piece of native copper, which had been hammered roughly into a flat, thick, irregular sheet. This is without holes, and is probably an unfinished ornament. Above this, and close to the skull, was a small copper cone, like many found on the altar of the great mound. Near the right shoulder was a large sea shell, like the others I have mentioned. This skeleton, as it lay in the grave, measured five feet ten inches from the top of the skull to the tip of the great toe, and the individual was not far from five feet four inches in height when living. With the exception of a portion of the sacrum, which had entirely disappeared, this skeleton was taken out in a perfect condition. The decay of the sacrum was owing, probably, to the fact that a small round stone had fallen in such a way as to allow water to percolate around it.

This skeleton is a good illustration of the absurdity of the common notion that as soon as skeletons which have long been buried are exposed to the air they fall to dust. I always have a quiet laugh when I read notices of that kind, and you may put all such accounts down to the inexperienced and clumsy work of the person removing the skeleton. The fact is that it requires

great care to remove the earth from about the bones, and very few persons will take the time to do it properly. As soon as a bone is uncovered most persons attempt to remove it at once, and of course it goes to pieces. Now if a skeleton is in dry earth or gravel, and is very dry and crumbling, the proper mode of procedure is to uncover the bones with great care, loosening the earth with the point of a small flat trowel and removing it from the bones by means of a small broom, or clothes brush, then let the moist air come in contact with the bone, or, if the air is very dry and hot, sprinkle the bones with water and let them absorb all they will. In this way the particles of bone swell and interlock, and after a while the bone can be safely taken up by avoiding force in removing it from the earth. In case the bones are in wet clay or earth the matrix must be removed with great care. In such cases the bones are soft and spongy and they must be allowed to remain in place until they have dried off; but they must not be exposed to the full heat of the sun, otherwise they will crack and splinter as they dry. Of course instances often occur where we find only minute fragments of a skeleton in a grave, all the rest having passed through a chemical change and been reduced to its earthly particles; but that every bone found in a grave can be preserved by using proper care I know from long experience to be the case. I may also call attention to the fact that the state of perfection of the skeleton, outside of certain limits, is not evidence, by itself, of the antiquity of the bones, as the conditions of burial, as well as the character of the bones must be taken into account.

In our exploration of this burial place we found three large pits which were covered with gravel and stones, like the grave I have just described. These pits had been dug through the compact iron-cemented gravel below the clay, even to the depth of five feet, and all the material taken from them had been carried away. The pits were then filled with ashes and burned earth, and covered with several inches of gravel and stones, like a grave. The sides of the pit were not burned, so it is evident that the ashes were not from fires on the spot. There were several places uncovered by our excavations near these pits or graves where fires had been made on the clay or gravel, but the ashes had been removed, and hence it is probable that they had been put in these carefully marked pits. But what had become of the gravel taken from them?

It is to be remembered that in the great mound of the group of altar mounds there was a layer of gravel two or three inches thick, which we have called the concrete layer. This gravel was cemented by a large amount of iron, and it has been a puzzle where the iron came from. It was far too great in amount to have been derived from the clay in the mound above, and besides, the gravel of the same layer, about the edges, was loose and light without any mixture of iron. Now this iron gravel from the burial place is of the same character as that forming the concrete layer in the mound, and it therefore seems probable that these pits must have been dug for the purpose of obtaining it. As this gravel had been used during the extensive ceremonies which must have taken place at the time the mound was constructed, the very place from which it was taken seems to have been held sacred and the pits therefore filled with burnt material, covered over and marked in the same manner as some of the graves. This again is further evidence of the connection of the burial place and the ceremonies which took place there with the altar mounds. The more we examine into the details of this wonderful group of ancient works, the more interesting and instructive they become. We have already spread before us the outlines of a grand picture of the singular ceremonies connected with the religious and mortuary customs of a strange people. There are still some touches to be given before the picture is complete, but it is more perfect than any other that has been drawn, and as our work goes on we may yet be able to fill it out, and finally present it as a perfect whole.—*The Boston Herald.*

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## AN INTERESTING CONNECTING GENUS OF CHORDATA.

BY E. D. COPE.

IT is well known that the only orifice in the cranial parts of the carapace in those so-called fishes of the Old Red sandstone, *Pterichthys* and *Bothriolepis*, is single and median, and is transversely placed, so as to cover the space occupied by the orbits and the interorbital region in such Vertebrata as have the eyes superior and close together. In the genus *Cephalaspis*, which has been also supposed to be a fish, two orbits and an interspace occupy about the corresponding position in the cranial buckler.